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A. D. MELVIN, CHIEF OF BUREAU.

A PRACTICAL DEMONSTRATION OF A METHOD FOR CONTROLLING THE CATTLE TICK.¹By W. D. HUNTER and J. D. MITCHELL,
Of the Bureau of Entomology.

U.S. DEPOSITORY

INTRODUCTORY.

This circular deals with a demonstration, carried out by the Bureau of Entomology under absolutely practical conditions, of a method for controlling the cattle tick. It is believed that equally successful results can be obtained by any cattle raiser. Exactly the same method as that of this demonstration can be followed throughout the tick-infested portion of Texas, in which are found three-fifths of all the cattle below the quarantine line. Moreover, with slight modifications the plan pursued could be applied to any farm in the quarantined area.

This demonstration was conducted in Victoria County, Tex. The object was not so much to exterminate the tick as to bring it under control and avoid as far as possible the dipping of cattle, which causes a heavy expense to the cattle producers in Texas and elsewhere. Under present conditions in the southern portion of the tick area the individual ranchman as a rule does not desire to eradicate entirely the ticks from his ranch. The result of complete extermination of the ticks, of course, would be the production of nonimmune cattle that would become sick upon being removed to any locality where they would be infested by fever ticks. Unless numbers of ranchmen join together to exterminate the pest over large areas the individual would at present much rather attempt control than eradication. This is a present, practical side of the question of great importance. Of course all intelligent ranchmen are heartily in favor of the plan of total extermination that is being very successfully followed by the Bureau of Animal Industry of this Department, namely, by gradually lowering the quarantine line. The means of control described herein are chiefly of value in regions which naturally can not be reached by that plan for some years. Moreover, the means recommended will greatly assist in absolute eradication when the time comes.

PLAN.

It has been known for a long time that pastures will become free of fever ticks when cattle are kept out for a certain time. This is due

¹This circular, reporting work done by the Bureau of Entomology, is issued as a publication of the Bureau of Animal Industry by agreement between the two bureaus, since the latter has charge of the Department's work of tick eradication. Other literature on this general subject may be obtained on application to the Chief of the Bureau of Animal Industry, Washington, D. C.

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altogether to the fact that these ticks can live and develop only on cattle and on a few other animals. In the absence of cattle (also horses, mules, and sheep) they must perish after a certain time.¹ These facts are taken advantage of in the so-called rotation or starvation system of controlling or eradicating ticks. This system was brought to perfection by Prof. H. A. Morgan, now director of the Tennessee Experiment Station, as a result of many years of study of the tick and experimentation while he was connected with the Louisiana State University and Agricultural and Mechanical College and Experiment Station.

LOCATION OF DEMONSTRATION PASTURE.

In a pasture of about 30,000 acres belonging to Mr. J. J. Welder, located in the northeastern portion of Victoria County, an area of about 1 mile square was selected for the demonstration. A corner of the pasture was cut off by building approximately 2 miles of fencing, giving an area of approximately 1 square mile. Purposely this small pasture was located in the most brushy and, according to Mr. Welder, who has owned the pasture for many years, the most "ticky" part. It was decided to make a severe test; to control the ticks, if possible, where they were known to be most numerous. Approximately one-fourth of the area selected was covered with live-oak runners, post oaks, and black jacks. The grass was not considered good, being largely sedge, which is not devoured readily by cattle. It was not burned during 1907. A well and a windmill were located in the area, so that the cattle were not compelled to leave for water.

DETAILS OF DEMONSTRATION.

The fence was finished July 25, 1907. On that date the cattle were all removed from the demonstration pasture, the gate was locked, and the key given to an agent of the Department. On December 12, 1907, that is, one hundred and forty days after the cattle were removed, 65 head, mostly grade Durhams, were taken without selection from the herd in the main pasture, dipped in a vat filled with a proprietary "tickicide" on the same day, and then placed in the demonstration pasture. These 65 head remained without disturbance throughout the winter and spring of 1908. In June Mr. Welder examined those in the demonstration pasture. As shown by his statement, hereinafter quoted, he was inclined to believe that the ticks had been exterminated. However, on June 26 Mr. Mitchell examined each one of the 65 cattle carefully and found a total of 7 ticks. These were on 4 animals; that is, 61 animals did not have any ticks whatever. Of the 4 animals which showed ticks one had 3 on the dewlap, one had 2 on the escutcheon, one had 1 on the dewlap, and one had 1 on the flank.

At the time of the examination just referred to Mr. Welder found the ticks so numerous on the cattle in the main pasture that he immediately gave directions for a general dipping. The outside cattle were heavily infested; no animal was free of ticks, and some of them were so excessively infested that from a distance they had the appearance of being mangy. At the same time the following of the starvation plan

¹The cattle tick, under very exceptional conditions, may develop on the dog. This is of only remote practical importance. For a discussion of this matter see Bulletin 72, Bureau of Entomology, United States Department of Agriculture.

had reduced the number of ticks in the demonstration pasture to a negligible quantity. It would not have been necessary to dip any of the cattle if they had been as free from ticks as those in the demonstration pasture.

The results of this demonstration from the standpoint of the owner, a large and successful cattle raiser in Texas, are given in the following letter:

VICTORIA, TEX., *June 30, 1908.*

Mr. W. D. HUNTER, Dallas, Tex.

DEAR SIR: The experimental pasture was located in a portion of my pasture, in the northeastern part of Victoria County, where the brush is very heavy and where the most ticks have always been found. On visiting my large pasture recently I found the ticks were so numerous that I immediately gave orders for a general dipping. At the same time I examined the cattle in the demonstration pasture and to my surprise did not see a single tick. Mr. J. D. Mitchell, however, informs me that after examining each one of the animals he found a total of 7 ticks on the 65 head. I am greatly pleased with the result of the experiment, which I consider is of great value to cattlemen. If I had had a double fence around the experimental pasture I believe that no ticks would be found in it at this time. I believe that the few found on the cattle came from ticks dropped along the fence. Moreover, if all my cattle were as free of ticks as those in the demonstration pasture at this time I would not be put to the expense of dipping.

Respectfully,

J. J. WELDER.

It was the opinion of both Mr. Welder and Mr. Mitchell that the condition of the cattle in the demonstration pasture was excellent. Nevertheless, there was not a great difference in condition between the inside cattle and outside cattle on June 26. Undoubtedly this condition would have been changed in favor of the cattle in the demonstration area in a short time, on account of the development of the ticks on the outside cattle. Moreover, it is to be noted that the grass in the demonstration pasture was not burned during the summer of 1907, while that in the main pasture was burned. This improved the forage for the outside cattle and made the grass on the demonstration pasture much poorer. The grass there was not burned for the reason that it was desired to do nothing toward controlling the ticks except the starvation process. The burning of the area would have complicated matters and made it impossible to determine how much effect was due to the fire and how much to starvation. As a matter of fact, the burning of the outside pasture undoubtedly destroyed numbers of ticks and thereby made the test the more severe.

GENERAL APPLICATION OF RESULTS.

It is considered by the Bureau of Entomology that this demonstration is of great practical importance. The results can undoubtedly be applied with slight modifications to all the conditions under which cattle are raised in the South. It will be noted that the process of dipping was a necessary part of the plan. This would not generally be a handicap, however, since dipping vats have been put up or are being put up by the majority of the large ranchers in Texas. On a small scale hand greasing or spraying the cattle would serve the same purpose as the dipping in the present case.

The results of this demonstration are more striking on account of the peculiar conditions as regards ticks that obtained in Texas during the winter and spring of 1907-8. On account of very dry weather during the summer and fall of 1907 the numbers of ticks were reduced every-



where in Texas to far below the normal. This general reduction probably makes the contrast between the cattle in the demonstration pasture and outside less than it would be under normal conditions. With the usual number of ticks the infestation outside would have been much heavier in June than it was, and it probably would have been necessary to dip the cattle at least as early in 1908 as was done in 1907, which was about the 20th of May.

The question might be raised as to where the few ticks found on the cattle in the demonstration pasture could have come from. It is the opinion of Mr. Welder and the writers that these few ticks were the progeny of individuals which were dropped by the outside cattle near the fence, which crawled up the fence posts and thence were taken up by the cattle on the inside. The building of a double fence would have eliminated such a contingency. Nevertheless, as already pointed out, the plan of the demonstration was on an absolutely practical basis. Under usual ranch conditions the building of a double fence would be impracticable.

The question will probably occur to the reader as to the length of time it may be necessary to keep cattle out of any certain area to reduce the ticks to an inconsiderable number. The time the pasture was free of cattle in this demonstration was one hundred and forty days. It was assumed that some of the cattle might have dropped ticks on the day they were removed. Therefore, it was desired to determine how long seed ticks from eggs deposited by an individual dropped at that time could have lived. This was done by placing engorged ticks in glass tubes about the time of the removal of the cattle, August 1. The ticks used in the experiment lived for one hundred and twenty days, none being found after November 29. To be on the safe side, twenty days were added to this period, making the one hundred and forty days during which the cattle were kept from the demonstration pasture. Information regarding this method and the means to be followed to give experimental ticks natural conditions has been published by the Bureau of Entomology in Bulletin 72, which may be had for 15 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Approved:

JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., *March 30, 1909.*